PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 12550900	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. **PCT**/AU2004/001830	International filing date *(day/month/year)* 24 December 2004	Priority date *(day/month/year)* 24 December 2003

International Patent Classification (IPC) or national classification and IPC

Int. Cl.

C07D 487/14 (2006.01) ***A61K 31/4353*** (2006.01) ***C07D 498/14*** (2006.01)
A61K 31/4188 (2006.01) ***A61P 31/14*** (2006.01)
A61K 31/424 (2006.01) ***C07D 471/14*** (2006.01)

Applicant

BIOTA SCIENTIFIC MANAGEMENT PTY LTD et al

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of **5** sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☐ *(sent to the applicant and to the International Bureau)* a total of sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
30 September 2005	03 April 2006
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer **KATHERINE MOERMAN** Telephone No. (02) 6283 2714

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2004/001830

Box No. I Basis of the report

1. With regard to the **language,** this report is based on:

[X] The international application in the language in which it was filed

[ ] A translation of the international application into , which is the language of a translation furnished for the purposes of:

[ ] international search (under Rules 12.3(a) and 23.1 (b))

[ ] publication of the international application (under Rule 12.4(a))

[ ] international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

[ ] the international application as originally filed/furnished

[X] the description:

pages **1-100** as originally filed/furnished
pages* received by this Authority on with the letter of
pages* received by this Authority on with the letter of

[X] the claims:

pages **101-111** as originally filed/furnished
pages* **112-114** as amended (together with any statement) under Article 19
pages* received by this Authority on with the letter of
pages* received by this Authority on with the letter of

[ ] the drawings:

pages as originally filed/furnished
pages* received by this Authority on with the letter of
pages* received by this Authority on with the letter of

[ ] a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. [ ] The amendments have resulted in the cancellation of:

[ ] the description, pages
[ ] the claims, Nos.
[ ] the drawings, sheets/figs
[ ] the sequence listing *(specify)*:
[ ] any table(s) related to the sequence listing *(specify)*:

4. [ ] This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

[ ] the description, pages
[ ] the claims, Nos.
[ ] the drawings, sheets/figs
[ ] the sequence listing *(specify)*:
[ ] any table(s) related to the sequence listing *(specify)*:

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	**1-37, 40, 45-47, 49, 62-77, 79-82**	**YES**
	Claims	**38, 39, 41-44, 48, 50-61, 78**	**NO**
Inventive step (IS)	Claims	**1-37, 40, 45-47, 49, 62-77, 80-82**	**YES**
	Claims	**38, 39, 41-44, 48, 50-60, 61, 78, 79**	**NO**
Industrial applicability (IA)	Claims	**1-82**	**YES**
	Claims		**NO**

2. Citations and explanations (Rule 70.7)

The present application is directed to polycyclic compounds and uses thereof. Specifically, Claims 1-29 are directed to the use of compounds of formula 1 in the treatment of infections involving viruses of the *Pneumovirinae* sub-family. Claims 38-65 are directed to compounds of formula I *per se*. Formula I as defined in independent Claim 38 is narrower than that defined in Claim 1; Claim 38 also excludes compounds from the scope of the claim. Claims 30-37 and 66 define pharmaceutical compositions, methods of treatment and prevention and further uses of the compounds of formula I. Claims 67-82 define further compounds, uses thereof and methods of separating enantiomers of such compounds.

The following documents have been considered for the purposes of this report:

D1 GB 1322339 (AMERICAN HOME PRODUCTS CORP) 4 July 1973 (formulae C and D, pages 6 and 7)

D2 US 3657221 (SULKOWSKI) 18 April 1972 (formula III and example VI)

D3 US 3885037 (SULKOWSKI) 20 May 1975 (formula 3 and examples X-XV)

D4 US 3966955 (SHRIVER) 29 June 1976 (formula III and col 4 lines 34-38)

D5 GB 1229651 (AMERICAN HOME PRODUCTS CORP) 28 April 1971 (formula V and examples)

D6 US 3624101 (SULKOWSKI) 30 November 1971 (formula V and examples)

D7 CA abstract 67:43744 and RN 13449-92-8
& Metlesics W et al., J. Org. Chem., 1967, 32(7), 2185-7

D8 US 4785002 (DRABER) 15 November 1988 (compound 16)

D9 US 3311629 (SULKOWSKI) 28 March 1967 (column 4 lines 15-16 and 31)

D10 WO 2002/066479 (BANYU PHARMACEUTICAL CO., LTD.) 29 October 2002 (compound 3147)

D11 US 3590043 (GRAF) 29 June 1971 (examples)

D12 CH 481124 (J. R. GEIGY AG) 31 December 1969 (Claim 1 and examples)

D13 GB 1059175 (AMERICAN HOME PRODUCTS CORP) 15 February 1967 (examples 2, 4, 6, 37, 38)

D14 US 4058529 (GRAF) 15 November 1977 (examples 1 and 2)

D15 US 3379733 (HOULIHAN) 23 April 1968 (example 4)

D16 CA abstract 137:337826 and RN 473998-86-6

D17 CA abstract 71:38862 and RNs 5983-38-0, 5983-39-1

D18 CA abstract 67:43799 and RNs 5810-68-4, 5983-39-1, 5983-45-9, 13450-15-2

Continued in supplemental box

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of:V

D1 discloses 9b-substituted-1-sulfonyl-1,2,3,9b-tetrahydro-5H-imidazo[2,1,a]isoindol-5-ones (formula D) which fall within the scope of formula I as defined in Claim 1. The compounds disclosed in D1 are intermediates in producing imidazolinyl phenyl carbonyl acid addition salts. Claims 1-37 are novel and inventive in the light of D1 as it does not disclose or suggest that the compounds would be useful in treating viral infections. Claims 38, 39, 41-44, 50-60 are not novel in the light of D1 as the compounds disclosed fall within the scope of the claims. Claims 40, 45-49, 61-82 are novel and inventive in the light of D1 as it does not disclose or suggest the matter defined within the claims. Claim 78 is not novel and inventive in the light of D1 as the compounds of formula C, which fall within the scope of Formula III as defined in Claim 78, are used as intermediates to generate compounds of formula D, which fall within the scope of Formula I as defined in Claim 38. Claim 79 is novel but not inventive in the light of D1 as the method of separating the enantiomers as defined, while not disclosed in the citation, is considered to be a common technique in the art of organic chemistry and would pose no burden to the skilled person. Claims 67-77 and 80-82 are novel and inventive in the light of D1 as the citation does not disclose or suggest the matter defined within the claims.

D2-D6 disclose 9b-substituted-1-sulfonyl-1,2,3,9b-tetrahydro-5H-imidazo[2,1,a]isoindol-5-ones which fall within the scope of formula I as defined in Claim 1. The compounds disclosed in D2-D6 are intermediates in producing imidazolinyl phenyl carbonyl acid addition salts. Claims 1-37 are novel and inventive in the light of D2-D4 as the citations do not disclose or suggest that the compounds would be useful in treating viral infections. Claims 38, 39, 41-44, 50-60 are not novel in the light of D2-D6 as the compounds disclosed fall within the scope of the claims. Claims 40, 45-49, 61-82 are novel and inventive in the light of D2-D6 as the citations do not disclose or suggest the matter defined within the claims.

D7 discloses a compound of formula I in which A is phenyl, R1 is phenyl and R2 is acetyl. Claims 1-37 are novel and inventive in the light of D7 as the citation does not disclose or suggest that the compound would be useful in treating viral infections. Claims 38, 41-44, 50-58 and 61 are not novel in the light of D7 as the compound disclosed falls within the scope of the claims. Claims 39, 40, 45-49, 59, 60, 62-66 are novel and inventive in the light of D7as the citation does not disclose or suggest the matter defined within the claims.

D8 discloses compound 16 in which A is pyridine, R1 is -C(O)OMe and R2 is Me. Claims 1-37 are novel and inventive in the light of D8 as the citation does not disclose or suggest that the compound would be useful in treating viral infections. Claims 38, 41-44, 48, 50, 54 and 55 are not novel in the light of D8 as the compound disclosed falls within the scope of the claims. Claims 39, 40, 45-47, 49, 51-53, 56-66 and 67-82 are novel and inventive in the light of D8 as the citation does not disclose or suggest the matter defined within the claims.

D9 discloses the compounds in which A is pyridine, R1 is p-Cl-phenyl or phenyl and R2 is Et or Pr. Claims 1-37 are novel and inventive in the light of D9 as the citation does not disclose or suggest that the compounds would be useful in treating viral infections. Claims 38, 39, 41-44, 48, 50-60 are not novel in the light of D9 as the compounds disclosed fall within the scope of the claims. Claims 40, 45-47, 49, and 61-82 are novel and inventive in the light of D8 as the citation does not disclose or suggest the matter defined within the claims.

Continued in supplemental box

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**

Continuation of: V

D10 discloses compound 3147 in which A is pyridine, R2 is Me and R1 is 3-CH_3,4-$CH_3CH_2CH_2NHC(O)CH_2O$-phenyl. Claims 1-37 are novel and inventive in the light of D10 as the citation does not disclose or suggest that the compound would be useful in treating viral infections. This compound is specifically excluded by proviso (viii) in Claim 38. Consequently, Claims 38-82 are considered novel and inventive in the light of D10 as the citation does not disclose or suggest the matter defined within the claims.

D11 and D12 disclose compounds in which A is phenyl, R1 is phenyl and R2 is COR3, where R3 is methylene substituted with amino, piperidinyl and morpholinyl. Claims 1-37 are novel and inventive in the light of D11 and D12 as the citations do not disclose or suggest that the compounds would be useful in treating viral infections. These compounds are specifically excluded by proviso (iv) in Claim 38. Consequently, Claims 38-82 are considered novel and inventive in the light of D11 and D12 as the citations do not disclose or suggest the matter defined within the claims.

D13-D18 disclose compounds in which A is phenyl and R2 is alkyl or alkyl-amino. Claims 1-37 are novel and inventive in the light of D13-D18 as the citations do not disclose or suggest that the compounds would be useful in treating viral infections. These compounds are specifically excluded by proviso (iv) in Claim 38. Consequently, Claims 38-82 are considered novel and inventive in the light of D13-D18 as the citations do not disclose or suggest the matter defined within the claims.

The subject matter defined within the claims is considered to be industrially applicable.